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On the Treatment of Copper and Cobalt Bearing Pyrite

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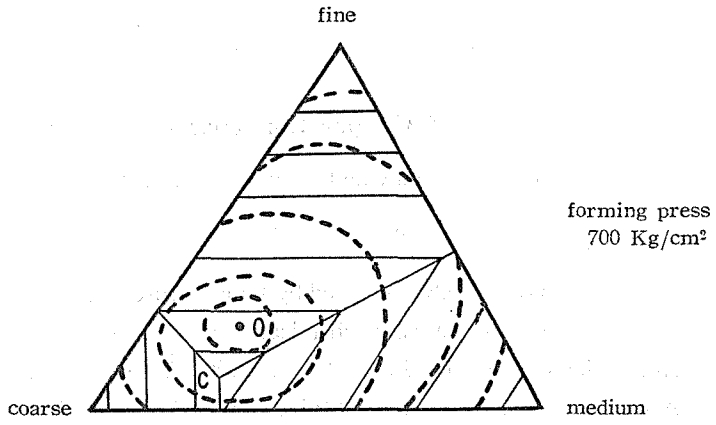
The observed lines of the specific volumes, given by a series of dotted lines, revealed the existence of the quite different relations between the specific volume and the grading from those estimated theoretically which should be represented by the assembly of straight lines.



15. On the Treatment of Copper and Cobalt Bearing Pyrite

Kiyokado NISHIHARA, Yoshio KONDO and Hidemi SAKO

(Sawamura Laboratory)

By pyrometallurgical method, the recovery of cobalt from copper bearing pyrite is difficult. However, by hydrometallurgy, copper and cobalt can be recovered profitably. In this study, roasting followed by leaching was investigated and best conditions of treatment were pursued on the copper and cobalt bearing pyrite whose composition was as follows:

Fe 37.34%, Cu 3.71%, Co 0.31% and S 42.76%.

The authors carried out experiments of chloridizing or oxidizing roasting and leaching with dilute sulphuric acid, and investigated the relations between the leaching degree of copper and cobalt and the conditions of roasting or leaching.

The roasting furnace used was of rotary kiln type, and leaching was carried out in the sample jar rotating on the pot mill of ca. 120 r. p. m..

Results obtained are as follows:

1) The suitable oxidizing roasting temperature for leaching copper and cobalt is about 550°C. And the leaching degree of components from this cinder (about 2.5% S) is

Cu 79%, Co 84% and Fe 5%.

2) At 450°C, by chloridizing roasting of cinder containing more than 10 % of residual sulphur, about 95 % of copper and 90~98 % of cobalt are leached, and moreover leaching degree of iron in this cinder is decreased evidently than that of oxidizing roasting.

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16. Viscosity of Copper Smelting Furnace Slags

Isao KUSHIMA and Tsuyoshi AMANUMA

(Sawamura Laboratory)

Viscosity of slags is remarkably affected by temperature and chemical composition. We have studied the relation between chemical composition and viscosity of copper smelting furnace slags at 1300°, 1275°, 1250°, 1200°, 1175°, 1150°, 1125°, 1100° and 1075°C. The various components were obtained by adding metallic oxides, i.e. CaO, CaO+BaO, BaO, MgO and Al_2O_3, to a standard slag.

Viscosity of slags was measured by Sphere pull-up viscosimeter employed by K. Endell and his co-workers. (Fig. 1). After the sample was melted in crucible, 3, 6 and 9 % various oxide components were added to the slags, and it was kept at 1300°C for more than 30 mins. The changes in composition during the measurement runs were studied in a preliminary test, and it was shown that in 30 mins, melt slags attained almost constant composition, so the changes in composition can be ignored.

The analyses of several experimental samples are shown in the next table. From this table, the slags used in this experiment were mainly composed of 34–36 % Fe (44–47 % FeO), 6.3–12.6 % Al_2O_3, and 34–37 % SiO_2, and were considered to belong to Al_2O_3–FeO–SiO_2 system.

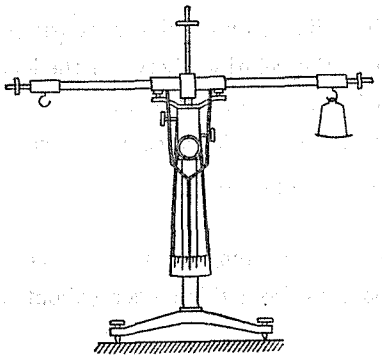

Fig. 1. Viscosimeter.

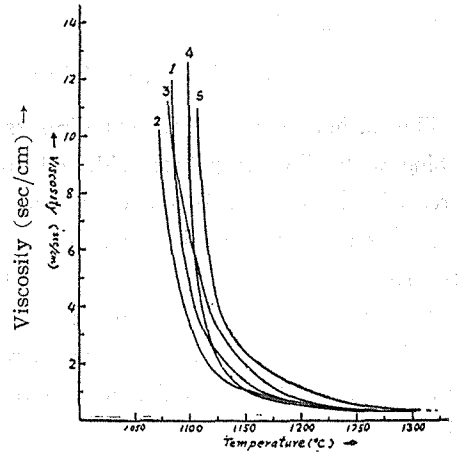

Fig. 2. Viscosity-temperature curves.